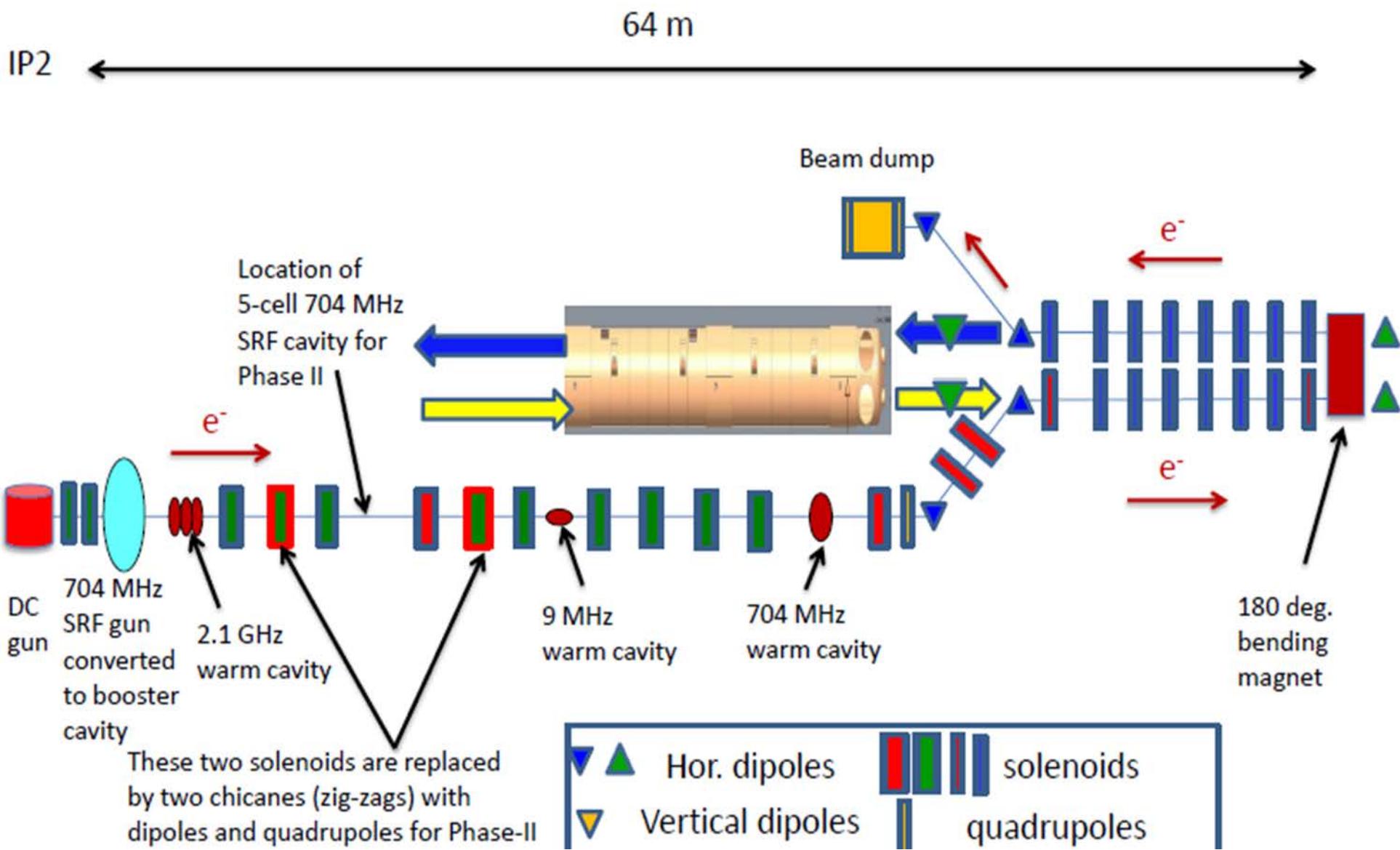


LEReC Phase-I (electron beam energies 1.6-2MeV):

Gun-to-dump mode

July 8, 2015

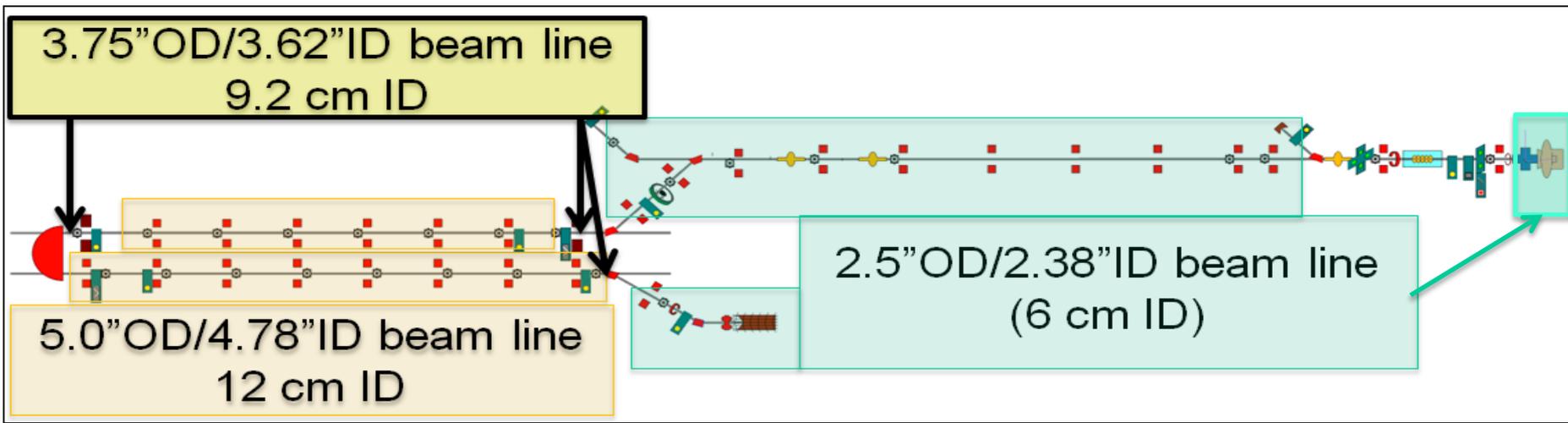
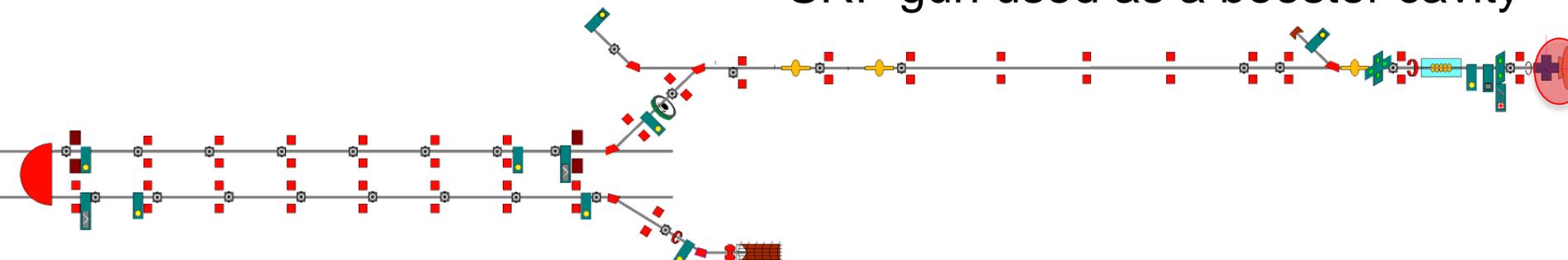


Overall Layout

64 m

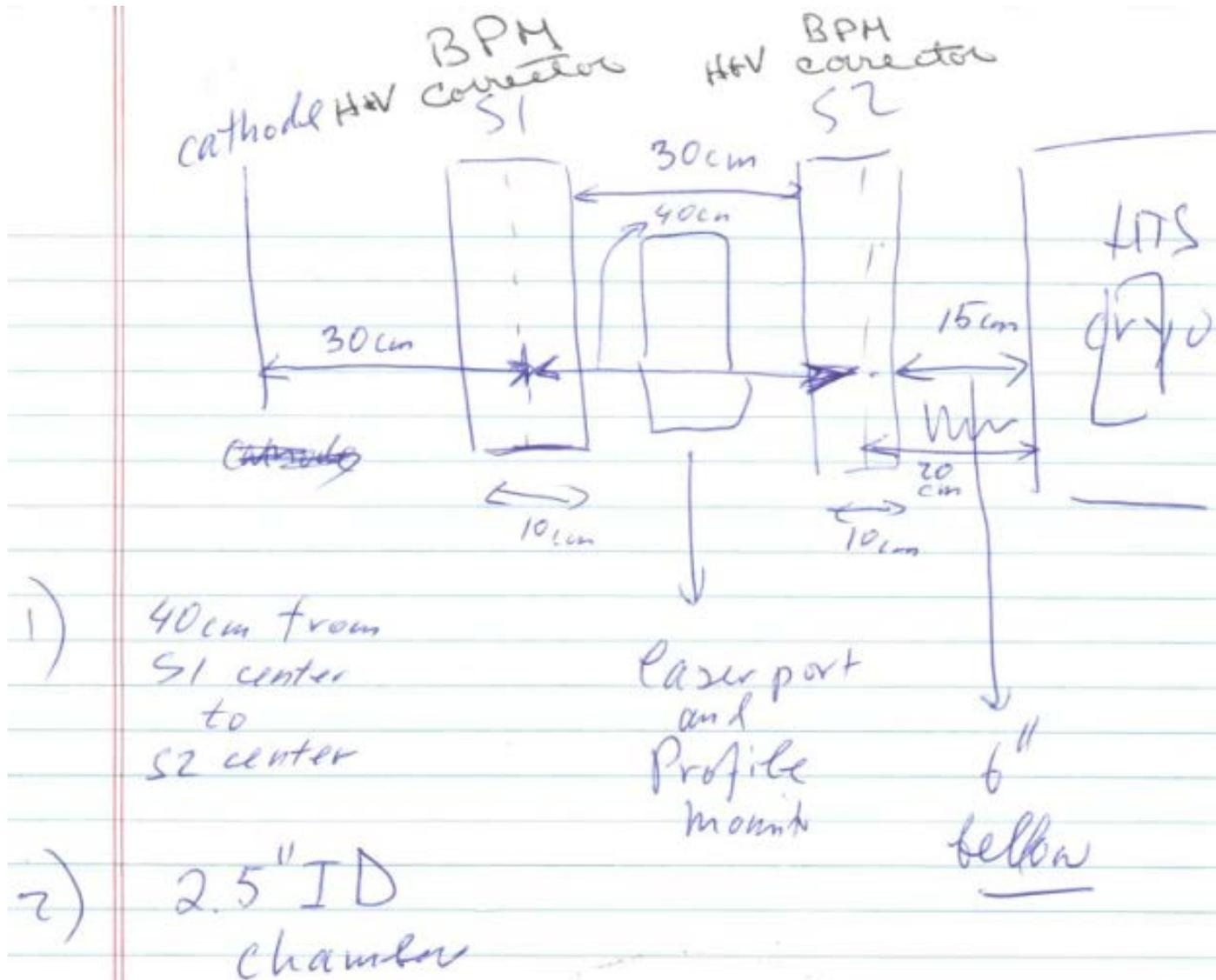
IP2

LEReC-I (1.6-2MeV): Gun to dump
 SRF gun used as a booster cavity

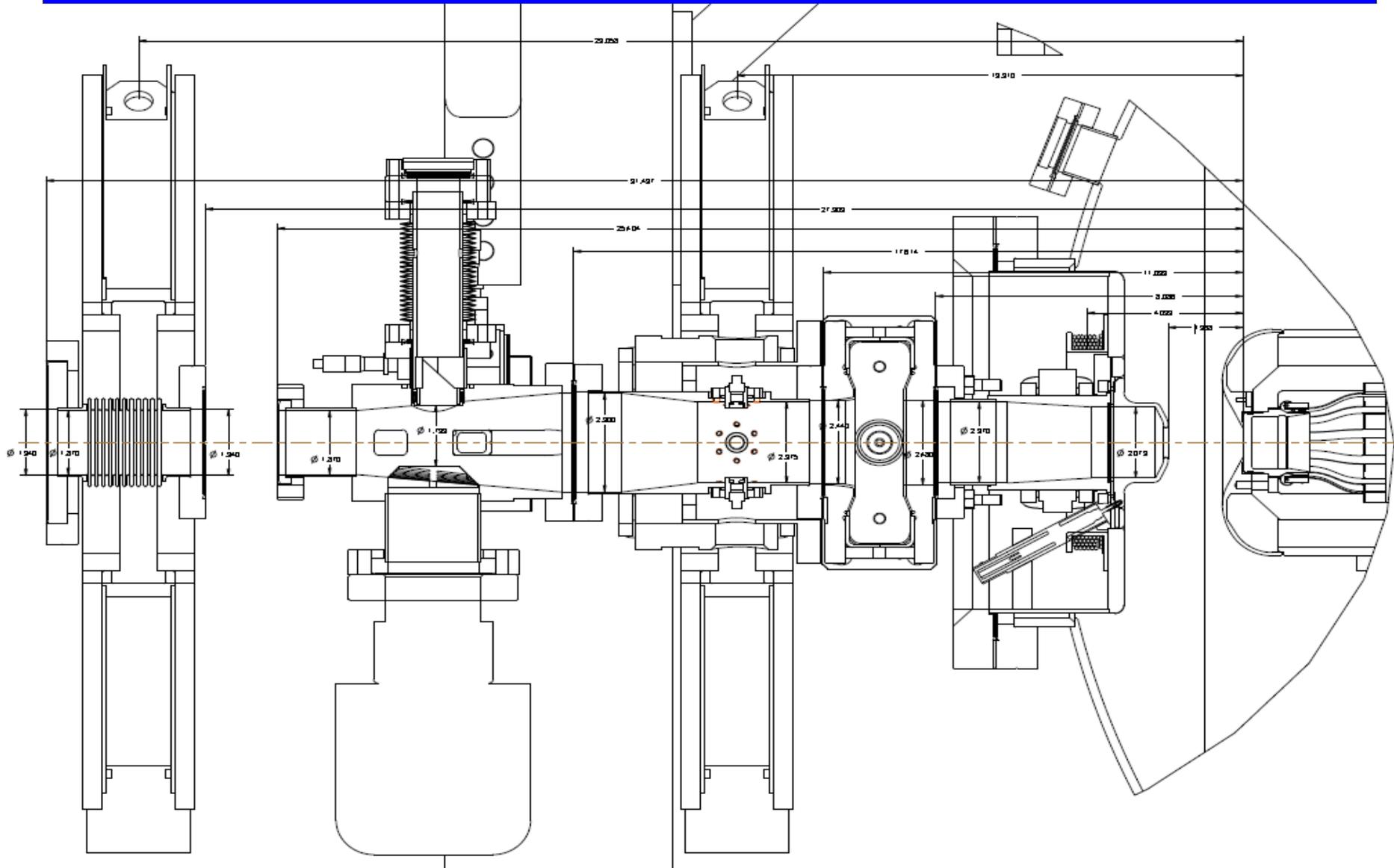


Low Energy RHIC electron *Cooling*

Preliminary Layout



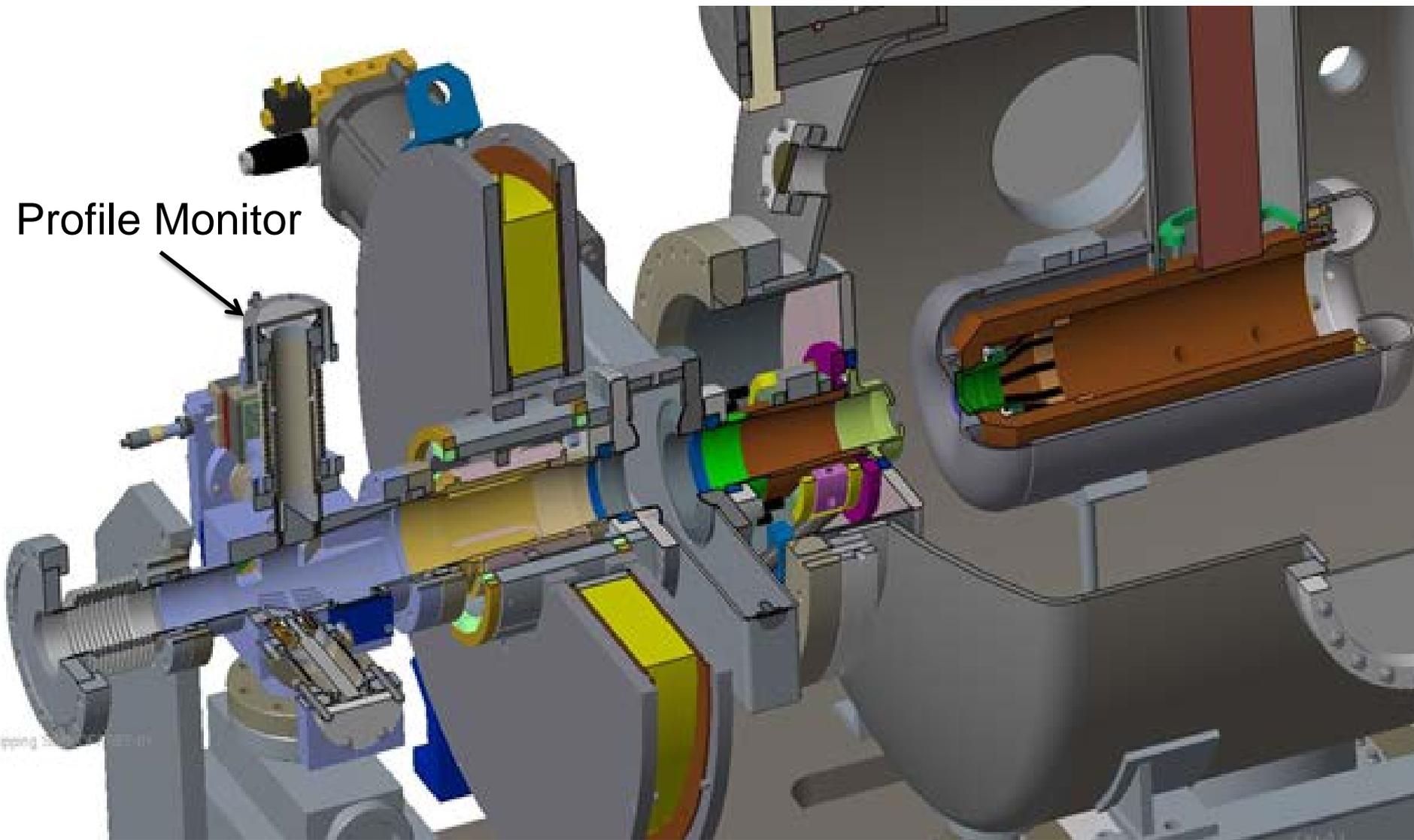
Preliminary Layout



Low Energy RHIC electron Cooling

Preliminary Preliminary Layout

Profile Monitor



Low Energy RHIC electron *Cooling*

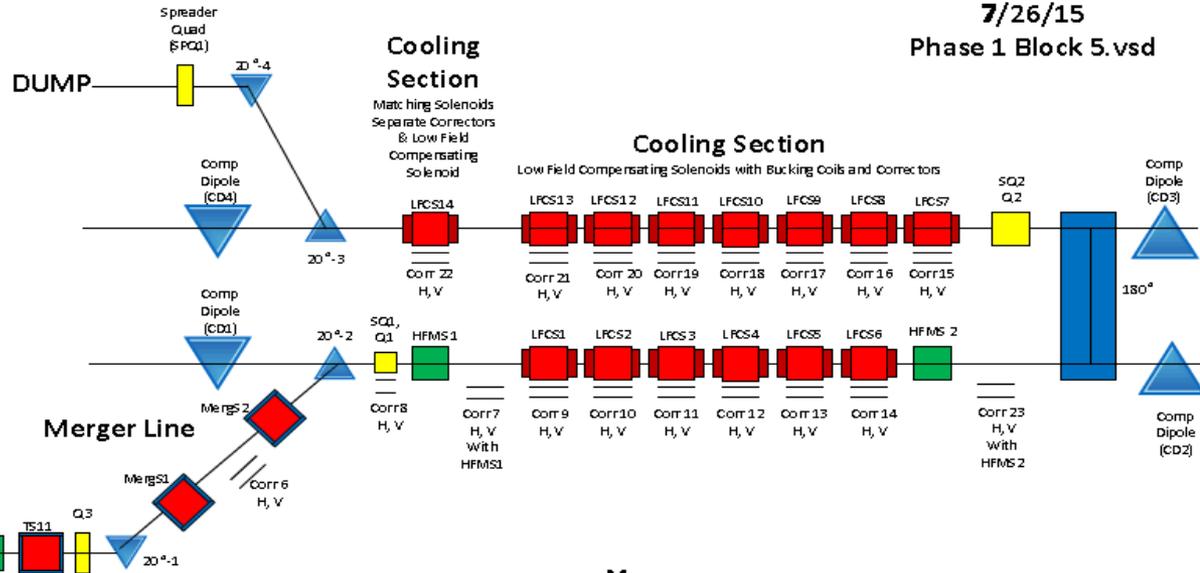
System	Device	Group	Scientific	Engineering		Design	
				Mechanical	Electrical		
DC Gun	DC Gun	Cornell		Liaw	Bruno	Halinski	
DC Gun	Cathode Production	Instr. Division	Rao	Liaw		Jackson	Martin
DC Gun	Cathode Insertion	Beam Ins/Comp		Liaw		DeMonte	
DC Gun	Power Supply	Cornell		Liaw	Bruno	Halinski	
DC Gun	Water cooling	Water	Scaduto	Liaw		Halinski	
DC Gun	Vacuum	Vacuum		Mapes		Halinski	
DC Gun							
DC Gun Anode Assembly	Small Solenoid Magnet	ESF	Meng	Liaw	Bruno	Halinski	
DC Gun Anode Assembly	H & V Dipole Correctors	Cornell	Meng	Liaw	Bruno	Halinski	
DC Gun Anode Assembly	Vacuum Chamber	Cornell	Kewish	Nayak	Smart	Halinski	
DC Gun Anode Assembly	500 V Power Supply	PS			Bruno		
DC Gun Anode Assembly							
Gun to SCRF Booster Cavity	Vacuum Beam Line Chambers, Bellows, Valves	Vacuum	Kewish	Nayak	Smart	Halinski	
Gun to SCRF Booster Cavity	Vacuum pumps and gauges	Vacuum		Nayak	Smart	Halinski	
Gun to SCRF Booster Cavity	Beam Line Solenoid		Meng	Mahler	Bruno	TBD	
Gun to SCRF Booster Cavity	Beam Line Corrector		Meng	Mahler	Bruno	TBD	
Gun to SCRF Booster Cavity	Laser Room Optics Table		Sheehy/Zhao	Bellavia	Zhao	TBD	
Gun to SCRF Booster Cavity	Laser Light Transport		Sheehy/Zhao	Bellavia	Zhao	TBD	
Gun to SCRF Booster Cavity	Laser Vacuum Chamber - Mirror Drives		Sheehy/Zhao	Bellavia	Zhao	TBD	
Gun to SCRF Booster Cavity	Laser Vacuum Chamber - Laser Optics Table		Sheehy/Zhao	Bellavia	Zhao	TBD	
Gun to SCRF Booster Cavity	Laser Vacuum Chamber - Profile Monitor		Theiberger	Bellavia	Miller	TBD	
Gun to SCRF Booster Cavity	Laser Vacuum Chamber and Vacuum Pumps			Nayak	Smart	TBD	
Gun to SCRF Booster Cavity	Beam Position Monitors	Beam I & C	Theiberger	Nayak	Gassner	Halinski	
Gun to SCRF Booster Cavity							
SCRF Booster Cavity	Upstream beam pipe modifications	RHIC Mech	W. Xu	McIntyre		Seberg	Meier
SCRF Booster Cavity	Vacuum valves	Vacuum		Nayak	Smart		
SCRF Booster Cavity	FPC modification	RHIC Mech	Smith	McIntyre		Seberg	
SCRF Booster Cavity	Cryogenic installation	Cryo	Than	Orfin	Tallerico	Meier	
SCRF Booster Cavity	Solenoid repair	RHIC Mech	Smith	McIntyre		Seberg	
SCRF Booster Cavity							
SCRF Booster Cavity	RF Power Supply	RF	Smith		Zaltsman		
SCRF Booster Cavity	LLRF	RF	Smith		Smith		
SCRF Booster Cavity	RF Wave Guide &/or Coax	RF	Zaltsman	Brutus	Zaltsman	TBD	

PS Layout Phase 1

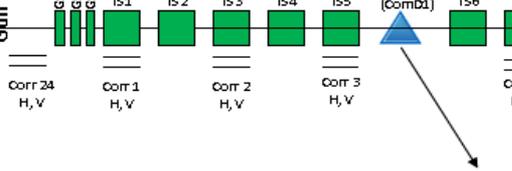
7/26/15
Phase 1 Block 5.vsd

Transport line

- 11 p.s.'s for 11 Sol magnets (TS1-11). Need V & I, For now using 11-250V 50A GEN ps's. Need V & I. TS1-10 are 500G. TS11=1.1kG.
- 10 Corr p.s.'s for only 5 Corrector (Corr1-5) magnets. Need V & I, For now using ten ERL 15V 10A SHIM p.s.'s. Do we need more than 5 Corr magnets? Are they in the correct location?
- 1 p.s. for one Commissioning Dipole (ComD1). Need V & I, For now using ERL extraction dipole with ERL ps which is Kepco BOP GL 50V 20A
- 1 p.s. for one Quad, Q3, Use ERL 15V 10A SHIM ps, taking quad from ERL.



Gun Section



Gun Section

- Two p.s.'s for Corr 24H & 24V. Need V & I. Using Comell Corr V & I for estimate.
- Three Solenoid magnets after the Gun (GS1-GS3). Need V & I. Using Comell Sol V & I for estimate.

Notes

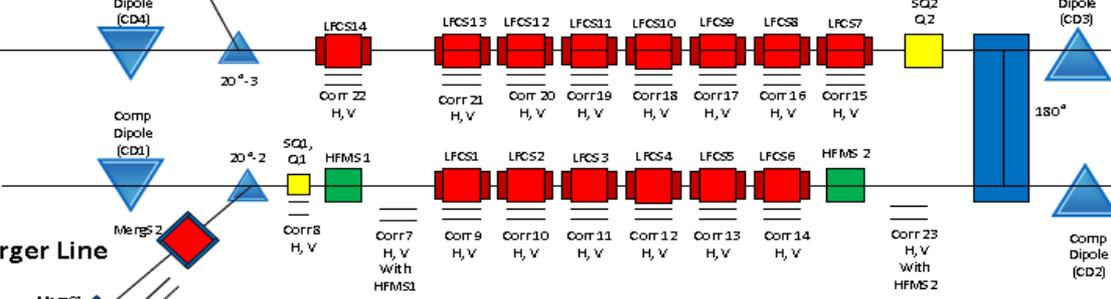
- Don't forget we need FWD's and for kepcos we might need blocking diode to make it unipolar, however this may not be true because we may want kepcos to work bipolar to get rid of remnant field
- Tell Bob V about new 30V 25A ps's we added because LFCSc14 is running as a single magnet and update D Phillips racks.
- I really need V & I for TS1-11 and MergS1-S2.
- TS2 & TS5 are replaced by 2 chicanes (zig zags) for Phase II.**

Cooling Section

Matching Solenoids
Separate Correctors
& Low Field
Compensating
Solenoid

Cooling Section

Low Field Compensating Solenoids with Bucking Coils and Correctors



Merger

- 2 p.s.'s needed for two 1.1kG Solenoid Magnets (MergS1-2). I~20A?, V is ~146.8V? I don't know what I should be for 1.1kG. Use 200V 50A Gen ps
- 2 p.s.'s needed for one Corrector magnet (Corr 6). Need V & I, For now using 2 ERL 15V 10A SHIM p.s.'s
- 1 p.s., ERL Kepco BOP GL 50V 20A for two 20° (20°-1&2) magnets in series.

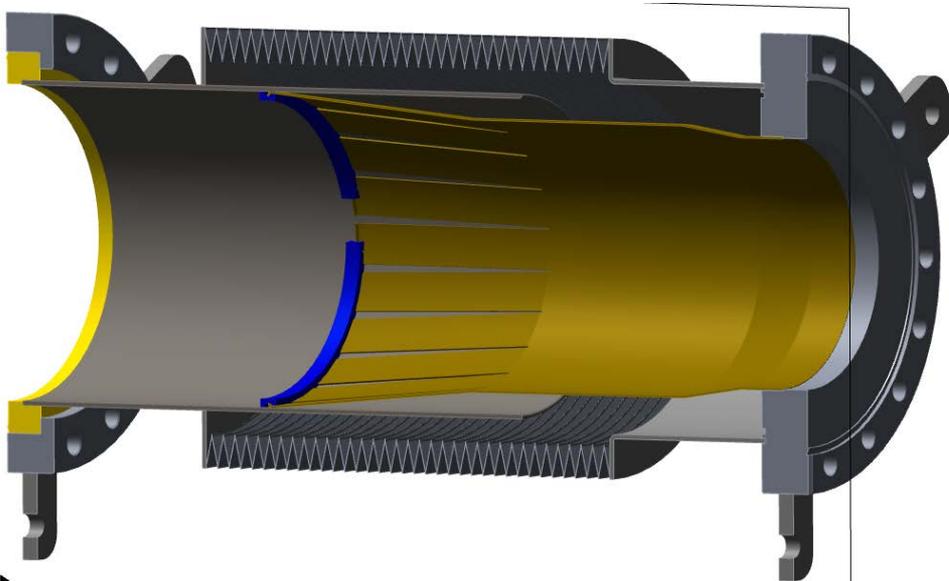
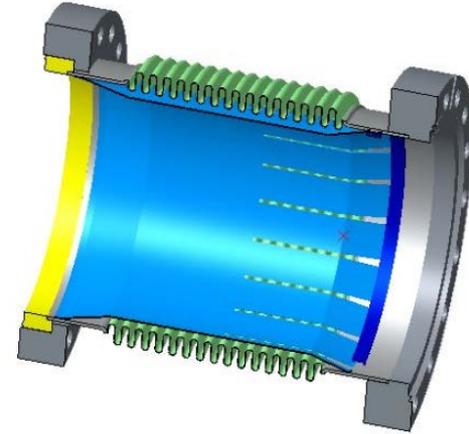
Cooling Section

- 1 p.s. 150V 22A for LFCSc1-6 cores 6 in series
- 1 p.s. 150V 22A for LFCScbc1-6 buck coils (2x) 6 in series
- 28 p.s.'s 20V 2A BIRA MCCR for Correctors, Corr 9-22 with LFCSc magnets.
- 1 p.s. 150V 22A for LFCSc7-13 cores 7 in series
- 1 p.s. 150V 22A for LFCScbc7-13 buck coils (2x) 7 in series
- 1 p.s. 30V 25A for LFCSc14 core single
- 1 p.s. 30V 25A for LFCScbc14 buck coils 2 in series from one magnet
- 1 180° p.s. +/-30ppm? Need to sit down with Alexei, Bob about specs, have 3 options, 39.3V, 7.8A
- 2 p.s.'s High Field Matching Solenoids (HFMS1-2), 150V 34A, **Note: PS Voltage may be low!**
- 4 p.s.'s for HFMS Correctors (Corr 7 & 23), need real Mag V & I. For now using ERL 15V 10A SHIMS
- 1 p.s. for Compensating Dipoles (CD1-4). All 4 in series. Use one kepcos 50V 20A p.s. No V & I yet
- 1 p.s. for Skew Quad (SQ1) V & I needed, 1 p.s. for Quad (Q1) V & I needed, 2 ps's for Corr 8 (V&I needed)
- 1 p.s. for Skew Quad (SQ2) V & I needed, 1 p.s. for Quad (Q2) V & I needed

Dump

- 1 p.s. needed for one Spreader Quad Magnet (SPQ1), No V & I, told to use ERL 15V 10A SHIM p.s.
- 1 p.s., ERL Kepco BOP GL 50V 20A, for two 20° (20°-3 & 4) magnets in series.

Hardware



Low Energy RHIC electron Cooling

LEReC Design Room Source Design Work



DC Gun Vacuum Chamber Fabrication Drawings (JH)

DC Gun SF6 Pressure chamber specification control drawings (JH)

DC Gun cathode cooling design for Karl S. Cornell (JH)

DC Gun stands (JH)

DC Gun to Booster SRF booster cavity beam line (JH)

DC Gun cathode insertion drive (WJ/VDM)

DC Gun cathode coating system vacuum chamber (PC)

DC Gun cathode transfer load lock and vacuum chamber (WJ)

Cathode production coating system design (BM)

